

USSN 10/087,584

AMENDMENTS TO CLAIMS

1. (Previously presented) A method of processing a digital image corresponding to a scanned document, the method comprising:

analyzing the image to obtain statistical data; and

deriving background noise removal data for the entire image based on the statistical data.

2. (Previously presented) The method as described in Claim 1 further comprising pre-processing the image while analyzing the image and using intermediate results obtained from pre-processing the image to obtain the statistical data.

3. (Previously presented) The method as described in Claim 1 wherein the background noise removal data includes a tonemap function or sampled values of the tonemap function .

4. (Currently amended) The method as described in Claim [22] 23 wherein the image and the background noise removal data are stored together.

5. (Previously presented) The method as described in Claim 1 wherein analyzing the image further comprises estimating a global background tone value.

6. (Previously presented) The method as described in Claim 5 wherein the background noise removal data is derived from the global background tone value.

7. (Cancelled)

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8. (Previously presented) The method as described in Claim 22 further comprising providing a user interface including an option allowing the selection of background noise removal on a page-by-page basis.

9. (Withdrawn) A method of estimating tone background in a digital image, the method comprising:

- generating edge-metrics for each pixel of the digital image;
- generating a first luminance histogram of all pixels in the image;
- using the edge-metrics to generate a second luminance histogram of pixels near edges; and
- estimating background luminance from the first and second histograms.

10. (Withdrawn) The method as described in Claim 9.

wherein for each pixel a first one of the edge-metrics is computed, the first edge-metric corresponding to the difference between the minimum and maximum values of neighboring pixels, and a pixel is tagged as an edge if its first edge-metric is above an adaptive threshold;

wherein for each pixel a second one of the edge-metrics is computed in proportional to the difference between the mean of the neighborhood minimum and maximum value, and one of the pixel value or smoothed pixel value, a pixel tagged as belonging to a light side or dark side of an edge according to its second edge-metric; and

wherein the pixels tagged as belonging to a light side of an edge are used to generate the edge-luminance histogram.

11. (Withdrawn) The method as described in Claim 9 wherein estimating the background luminance includes obtaining minimum error threshold values from the histograms and weighting the threshold values.

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12. (Withdrawn) The method as described in Claim 9 wherein performing the background removal includes bleaching all pixel values having a luminance that is more than the estimated background luminance.

13. (Cancelled)

14. (Previously presented) The method as described in Claim 1 wherein the image is color-converted to a luminance-chrominance color space prior to obtaining the statistical data, and wherein the statistical data is obtained from the luminance channel.

15. (Currently amended) A system for processing a digital image corresponding to a scanned document, the system comprising:

statistical analyzer for analyzing the image to obtain statistical data;

function derivator for deriving background noise removal data for the image based on the statistical data; and

data storage for storing the image and the background noise removal data together to allow the scanned document to be displayed with background noise removal and without background noise removal.

16. (Previously presented) The method of claim 1 wherein the statistical data and the background noise removal data are obtained in real time, as the document is being scanned.

17. (Previously presented) The system as described in Claim 15 wherein the statistical analyzer pre-processes the image while analyzing the image and uses intermediate results obtained from pre-processing the image to obtain the statistical data.

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18. (Previously presented) The system as described in Claim 15 wherein the background removal data includes a tonemap function or sampled values of the tonemap function.

19. (Currently amended) The system as described in Claim 15 further comprising a user interface for allowing display of the scanned document with and without background noise removal~~viewing of a rendering of image data dependent on the user selection.~~

20. (Currently amended) The system as described in Claim 19 ~~wherein the 15~~further comprising a user interface including~~includes~~ an option allowing the selection of background noise removal on a page-by-page basis.

21. (Cancelled)

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22. (Currently amended) The method of claim [1]23, further comprising
~~storing the entire image and the background noise removal data, the~~
~~stored image and the stored data made available for interactive~~
~~processing; and~~
providing user selection to interactively:

in a first case, use the stored image and the stored data to
remove background noise from the stored image prior to rendering
the stored image; and

in a second case, bypass background noise removal in the
stored image prior to rendering the stored image;
~~wherein the user selection allows the stored image to be displayed with~~
~~and without background noise removed.~~

23. (New) The method of claim 1, further comprising storing the entire
image and the background noise removal data to allow the scanned
document to be displayed with background noise removal and without
background noise removal.